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DEVELOPS NEW PHOTONEPRELOMETERS

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A Digest/

Two new photonerhelometers have been developed by the Gorkiy Physicotechnical Research Institute. One of these instruments is intended for automatic control of calcium content in a saturated solution of common salt, the other for determining small quantities of sulfates in alumin a powder. In both cases, it was found advantageous to use a differential circuit employing two selenium photocells connected in opposition, and a potentioneter for obtaining a balance as shown by a zeromalvanometer.

Photomephelometer FOLO-46

This instrument will measure calcium content in a range 1 - 5 milligrams of calcium in a liter of saturated salt solution. It consists of a light source, optical system, two parallel tubular containers (horizontally placed), two photocells (and diaphragms), a potentiometer, and a zero galvanometer. An electric bulb, with a rheostat for intensity control, serves as the light source for both sections by means of mirrors and condensing lenses. After passing through the solutions in the tubes, the light acts on the photocells. The front panel contains a voltmeter for the lamp circuit, a zero galvanometer, and a potantiometer dial.

In conducting tests, it is first necessary to zero the galvanometer by filling both tubes with purified brine and adjusting the photoceil diaphragus to a balance point. The lower tube is then emptied and refilled with the test solution. Equilibrium is restored with the potentiometer, whose reading gives the calcium content on a calibrated graph. The filling and refilling processes are carried out by a system of connecting tubes and stopcocks between the instrument and the two tanks of purified brine and test solution.

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Photomephelometer FON-47

This instrument is used for determining the sulfate content in aluminum powder in the range 0.05 - 1 milligram of sulfate in 150 milliliters of solution at 0.05 milligram intervals. It can also be used as a photocolorimeter for determining iron content (concentrations of 0.005 - 0.05 milligram per 50 milliliters of solution, at 0.005-milligram intervals) and for other elements.

The photonephelometer FON-47 is quite similar in construction to the FOLO-46 previously described. The main difference is in the V-shaped placement of the two tubes, thereby eliminating the need for mirrors in the optical system. The diaphragms in front of the photocells are used for balancing the instrument when both containers are filled with "zeroing" solution. Set screws on the lamp holder permit three-way adjustment.

The instrument is equipped with two types of tubular containers: (1) a 100-milliliter container for measuring turbidity, and (2) a 20-milliliter container for use in photocolorimeter work. In the former case, very accurate results may be obtained in measuring the sulfate content, while in the latter, it is possible to determine the iron content in half the time required for previous instruments.

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